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Ng et al.

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(54) **AUTOMATIC WINDING DEVICE USED FOR AUTOMATIC WINDING WATCH**

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G04D 7/00 (2006.01)
G04B 5/00 (2006.01)
G04B 3/00 (2006.01)

(52) **U.S. Cl.**
CPC ***G04D 7/009*** (2013.01); ***G04B 3/006*** (2013.01); ***G04B 5/00*** (2013.01)

(58) **Field of Classification Search**
CPC G04B 3/00; G04B 3/006; G04B 5/00; G04B 5/02; G04C 1/00; G04D 7/00; G04D 7/009
See application file for complete search history.

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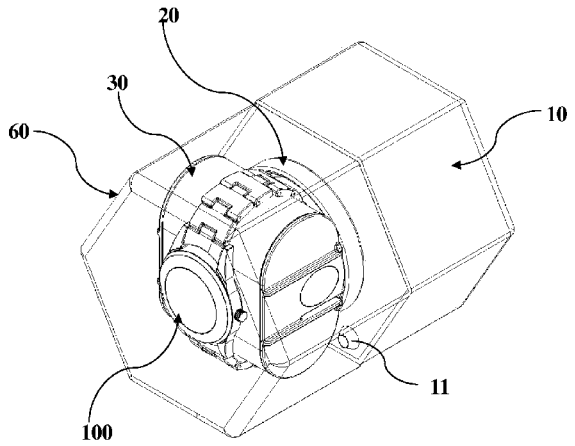
Assistant Examiner — Matthew Powell

(57) **ABSTRACT**

The patent application relates to an automatic winding device used for automatic winding watch, which includes a box body, a rotating seat arranged on the box body and relatively rotatable to the box body, a holding seat fixed on the rotating seat and used for placing the automatic winding watch, a driving mechanism driving the rotating seat to rotate, and a control device controlling the rotating mode of the driving mechanism. The driving mechanism is arranged in the box body. The automatic winding device used for automatic winding watch can be rotatably arranged on the box body through the rotating seat. The watch is sheathed on the holding seat and then placed on the rotating seat. Compared with the existing rotation in a rotating cavity, the patent application reduces the noise, and is beneficial for displaying the watch.

15 Claims, 6 Drawing Sheets



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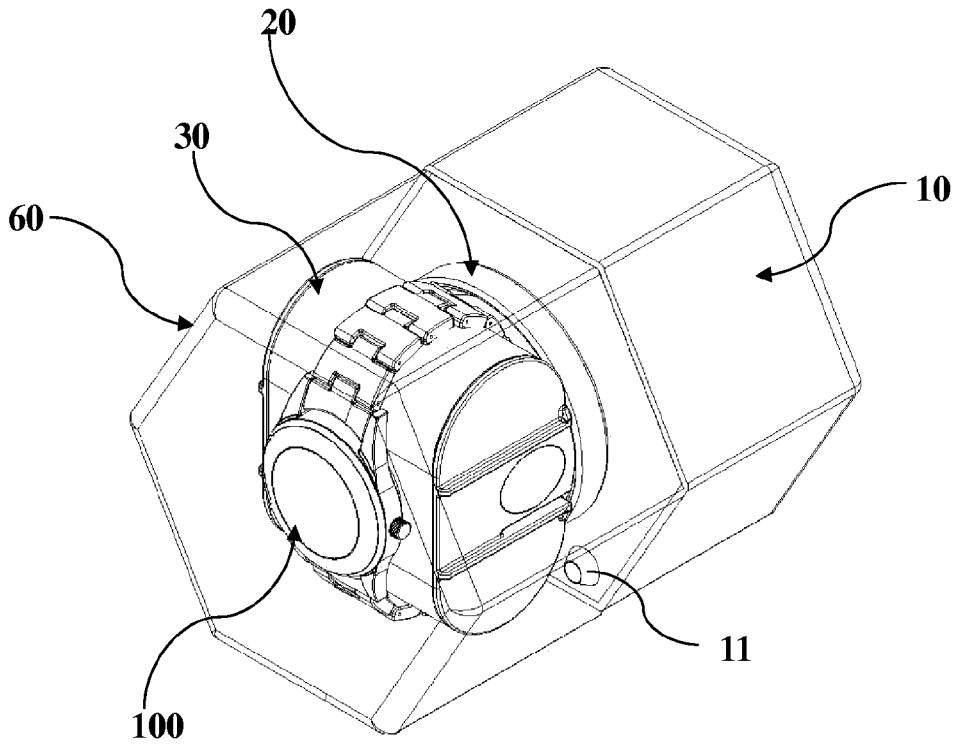

FIG. 1

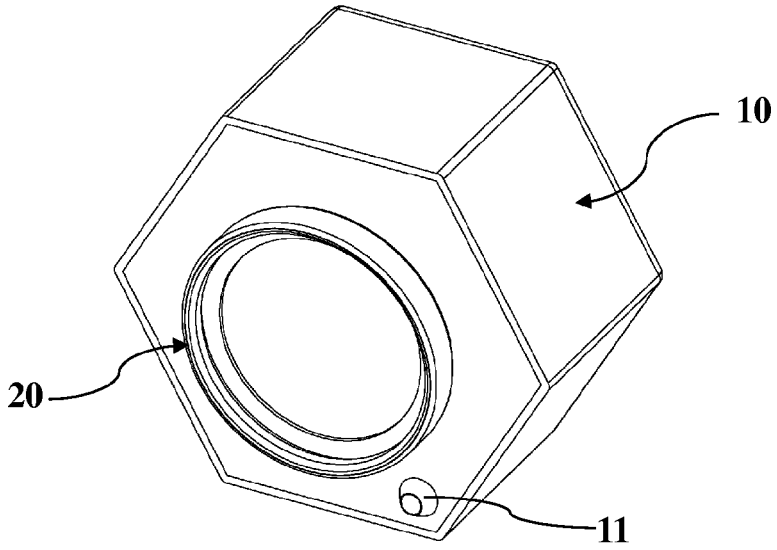

FIG. 2

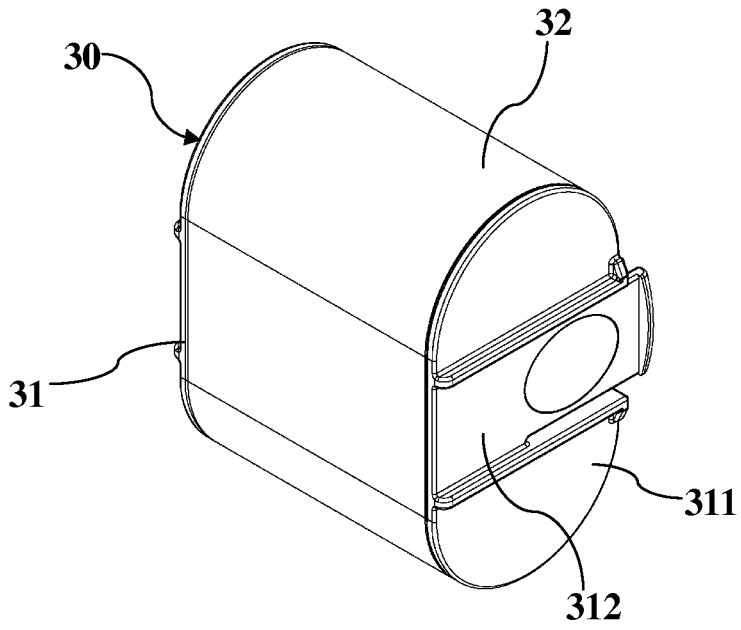

FIG. 3

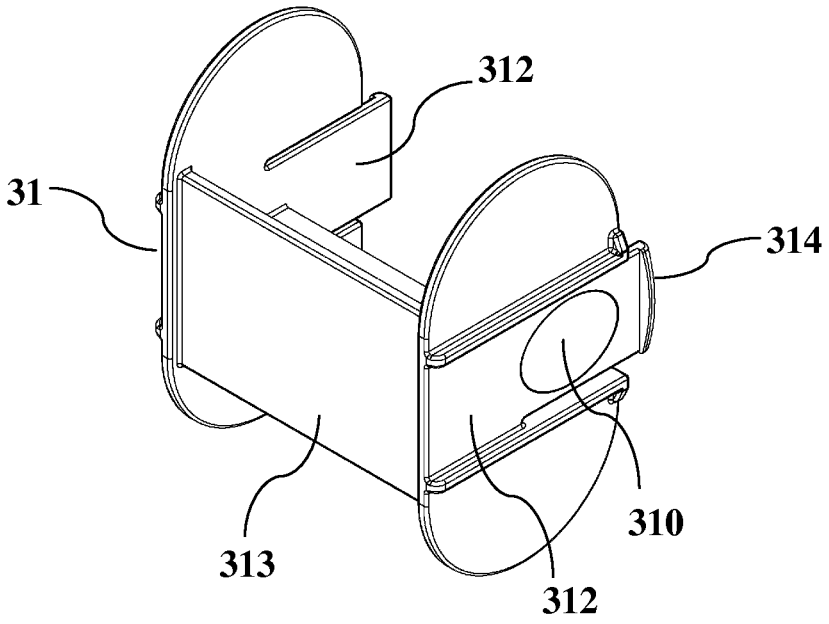

FIG. 4

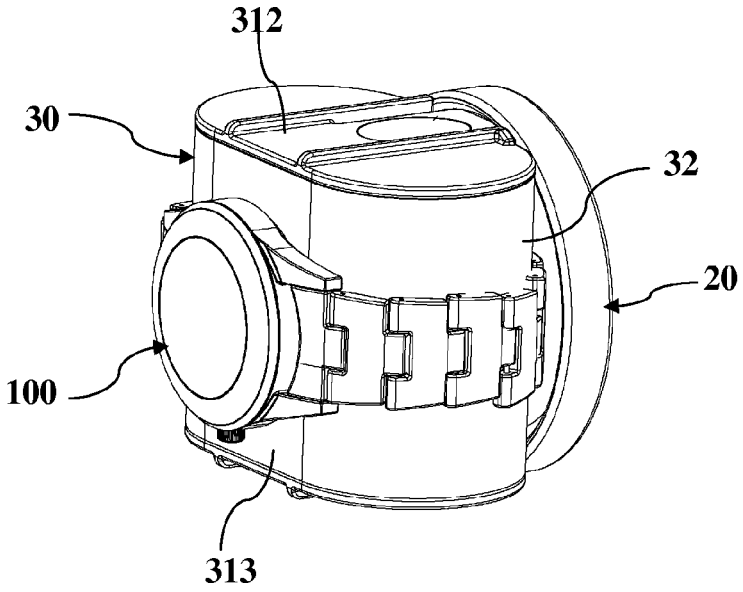

FIG. 5

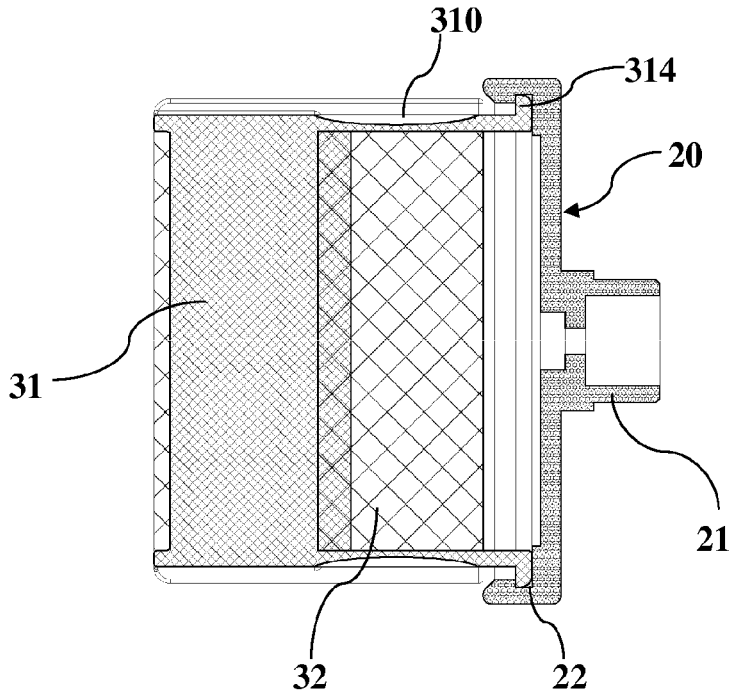

FIG. 6

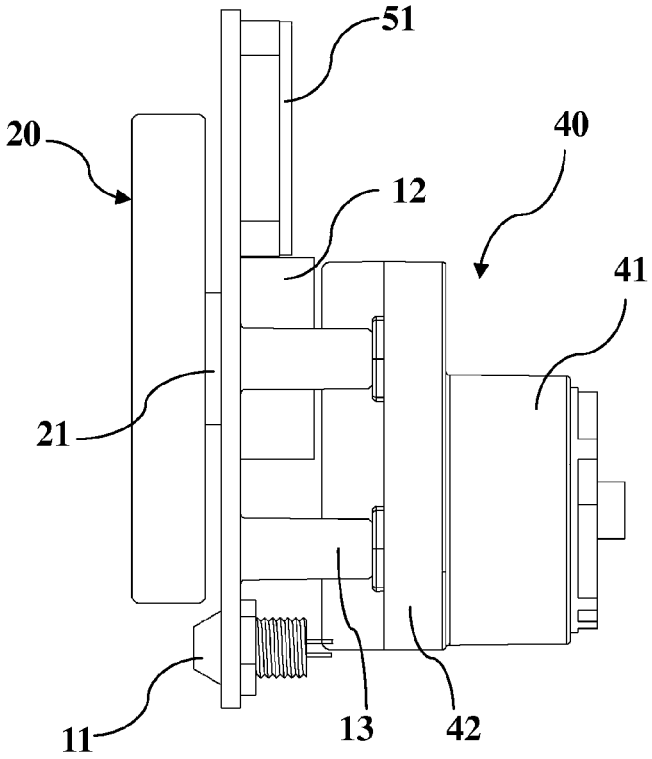

FIG. 7

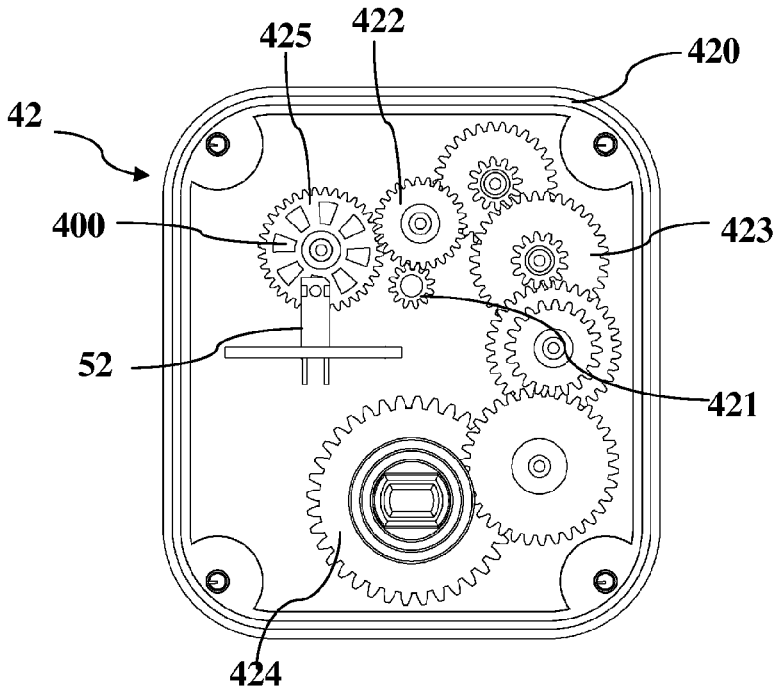

FIG. 8

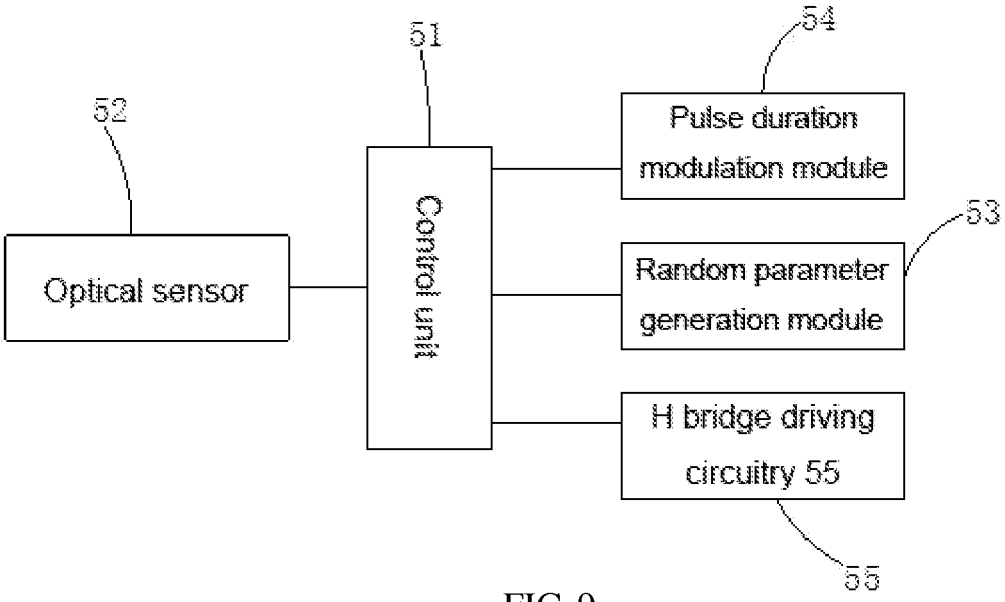
51
52
54
53
55
Optical sensor
Control unit
Pulse duration modulation module
Random parameter generation module
H bridge driving circuitry 55

FIG. 9

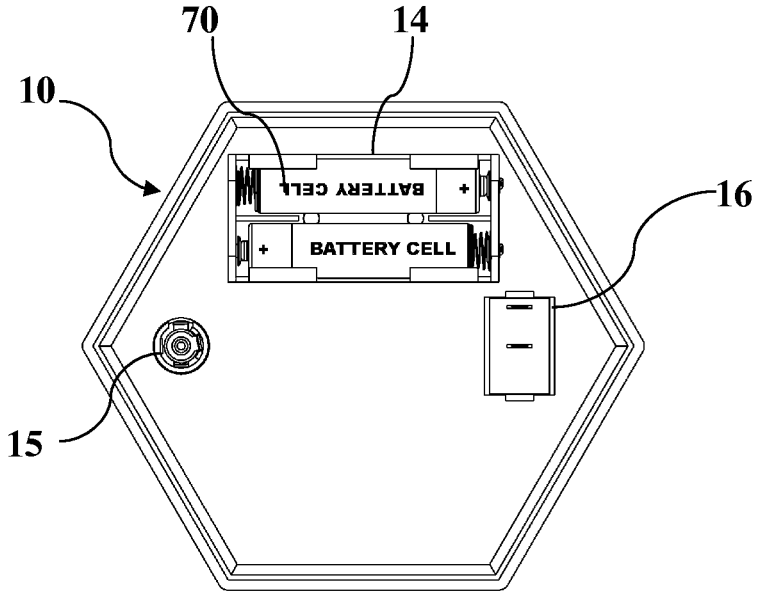
70
14
10
16
15
BATTERY CELL
BATTERY CELL

FIG. 10

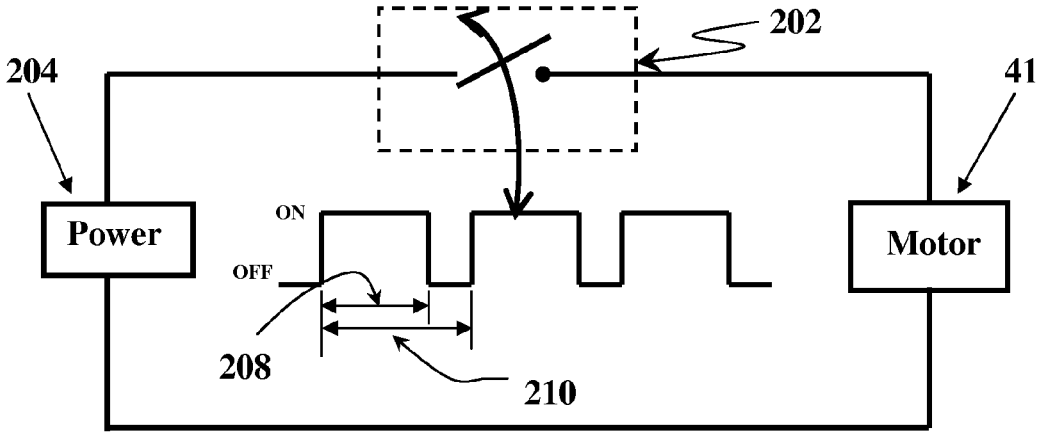
202
204
41
Power
ON
OFF
Motor
208
210

FIG. 11

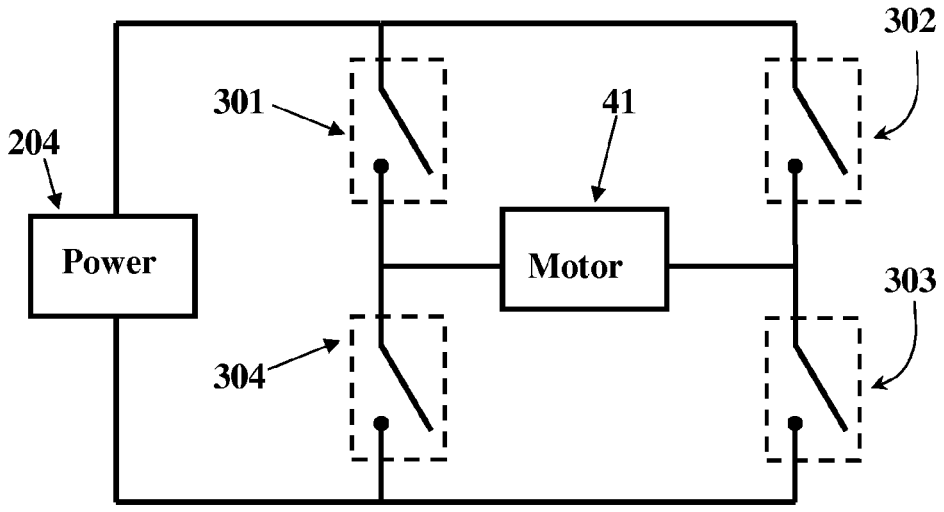
302
301
41
204
Power
Motor
303
304

FIG. 12

AUTOMATIC WINDING DEVICE USED FOR AUTOMATIC WINDING WATCH

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority of Hong Kong patent application No. 13112084.7 filed on Oct. 28, 2013, the entire content of which is hereby incorporated by reference.

TECHNICAL FIELD

The patent application relates to a winding device, and in particular, to an automatic winding device used for automatic winding watch.

BACKGROUND

An automatic winding watch (mechanical watch) drives a hour hand and a minute hand therein to run through an internal winding mechanism. The winding principle of the winding mechanism is to employ an eccentric rotor and utilize a gravity effect as well as the oscillating or winding of an arm of a user while wearing to rotate, so as to drive gears to wind up a mainspring to realize winding. The energy for winding the watch can be stored in the winding mechanism, and can maintain the watch to run for at least 24 hours. In the case that the automatic winding watch is not worn, the energy stored therein is gradually consumed till it is used up, and the watch stops running then there is no driving force. When wearing the watch again, it needs to re-wind the watch, which is inconvenient to use.

In order to make the automatic winding watch still work continuously in the case of being not worn, a winding device for watch appears in the market, for winding the watch in the case of displaying the watch or in the case that the user does not wear the watch. The winding device on the present market comprises a hollow bowl-shaped or drum-shaped rotating cavity and a sheathing mechanism used for sheathing the automatic winding watch. The sheathing mechanism is contained in the rotating cavity. The rotating cavity is driven by a motor to rotate along an axis thereof so as to drive the watch to rotate, thereby winding the watch. However, the noise generated by the motor in the existing winding device during the rotating process is amplified by the rotating cavity, thus increasing the noise. Furthermore, the arrangement of the rotating cavity makes a watch band of the watch be hidden therein, which is not beneficial for displaying.

SUMMARY

A technical problem to be solved by the patent application is to provide an automatic winding device used for automatic winding watch, which can wind the automatic winding watch in the case that the automatic winding watch is not worn.

To solve the technical problem, the patent application employs a technical solution as follows: the patent application provides an automatic winding device used for an automatic winding watch, which comprises a box body, a rotating seat arranged on the box body and relatively rotatable to the box body, a holding seat fixed on the rotating seat and used for placing the automatic winding watch, a driving mechanism driving the rotating seat to rotate, and a control device controlling the rotating mode of the driving mechanism, wherein the driving mechanism is arranged in the box body.

In the automatic winding device used for automatic winding watch according to the patent application, the holding seat comprises a U-shaped framework and a flexible mandrel arranged in the framework for sheathing the automatic winding watch. Two relative side plates of the framework are respectively formed with an elastic locking arm used for fixing the holding seat on the rotating seat.

In the automatic winding device used for automatic winding watch according to the patent application, the tail end of the elastic locking arm towards the rotating seat is provided with a clamping bolt. The rotating seat is provided with a clamping groove matched with the clamping bolt.

In the automatic winding device used for automatic winding watch according to the patent application, the rotating seat is circular, and the clamping groove is arranged on the internal side surface of the rotating seat. Or, the rotating seat is tabular, and the clamping groove is arranged on the surface of the rotating seat facing to the holding seat.

In the automatic winding device used for automatic winding watch according to the patent application, the control device comprises a control unit, an optical sensor used for inducing the rotational velocity and rotation angle of the driving mechanism, a random number generation module for generating random parameters, a pulse duration modulation module matched with the random parameter generation module so as to generate a corresponding random rotating mode, and an H bridge driving circuitry. The optical sensor, the random parameter generation module, the pulse duration modulation module and the H bridge driving circuitry are all electrically connected with the control unit.

In the automatic winding device used for automatic winding watch according to the patent application, the driving mechanism comprises a motor and a transmission case connected between the motor and the rotating seat. The motor is electrically connected with the control unit through the H bridge driving circuitry.

In the automatic winding device used for automatic winding watch according to the patent application, the transmission case comprises an input gear connected with the motor, a first gear engaged with the input gear, an output gear, a plurality of second gears engaged between the first gear and the output gear in sequence, and a detection gear engaged with the first gear. The optical sensor is matched with the detection gear. The transmission case is fixedly connected with the rotating seat through the output gear. The bottom of the rotating seat is provided with a joint pin stretching into the box body and connected with the output gear. A bearing support corresponding to the joint pin is arranged in the box body.

In the automatic winding device used for automatic winding watch according to the patent application, the box body is further provided with a power indicator light. The power indicator light is electrically connected with the control unit.

In the automatic winding device used for automatic winding watch according to the patent application, a plurality of uniformly-spaced through holes are arranged on the detection gear, encircling the central axis of the detection gear. Infrared light beams of the optical sensor are alternatively irradiated on the detection gear through the through holes during the rotating process of the detection gear.

In the automatic winding device used for automatic winding watch according to the patent application, the automatic winding device further comprises a box cover. The box cover is covered on the box body to shield the rotating seat and the holding seat between the box body and the box cover. The box body is a sealed box body.

The advantageous effects to implement the patent application are as follows: the automatic winding watch is easy to hold and disassemble; the automatic winding device used for

automatic winding watch can be rotatably arranged on the box body through the rotating seat; compared with the existing rotation in a rotating cavity, the patent application reduces the noise, and is beneficial for displaying the watch; the watch is sheathed on the holding seat and then placed on the rotating seat; with the rotation of the rotating seat, the automatic winding device used for an automatic winding watch can simulate the swinging of a human arm to wind the watch, so that the watch still keeps enough power to run normally in the case of being not worn.

BRIEF DESCRIPTION OF DRAWINGS

The patent application will be further described hereinafter with reference to the drawings and embodiments, in the drawings:

FIG. **1** is a perspective view of an automatic winding device used for automatic watch according to an embodiment of the patent application;

FIG. **2** is a structure schematic view of a box body and a rotating seat in FIG. **1**;

FIG. **3** is a structure schematic view of a holding seat in FIG. **1**;

FIG. **4** is a structure schematic view of a framework in FIG. **3**;

FIG. **5** is a structure schematic view of the rotating seat, the holding seat and an automatic winding watch in FIG. **1**;

FIG. **6** is a sectional view of a holding seat in FIG. **5**;

FIG. **7** is an internal structure schematic view of the box body in FIG. **1**;

FIG. **8** is a structure schematic view of a transmission case in FIG. **7**;

FIG. **9** is a schematic view of a module of a control device according to an embodiment of the patent application;

FIG. **10** is a structure schematic view of the bottom of the box body in FIG. **1**;

FIG. **11** is a circuit diagram of pulse duration modulation control according to the patent application; and

FIG. **12** is a circuit diagram of a control motor of an H bridge driving circuitry according to an embodiment of the patent application.

DETAILED DESCRIPTION

As shown in FIG. **1** and FIG. **7**, an automatic winding device used for automatic watch according to an embodiment of the patent application comprises a box body **10**, a rotating seat **20**, a holding seat **30**, a driving mechanism **40** and a control device. The rotating seat **20** is arranged on the box body **10** and can rotate relatively to the box body **10**. The holding seat **30** is used for holding the automatic winding watch **100**. The holding seat **30** is fixed on the rotating seat **20** so as to rotate with the rotating seat **20**. The driving mechanism **40** is used for driving the rotating seat **20** to rotate. The control device is then used for controlling the rotating mode of the driving mechanism **40**. The automatic winding device controls the driving mechanism **40** to work through the control device, thus driving the rotating seat **20** to rotate, so as to drive the holding seat **30** and the automatic winding watch **100** thereon to rotate according to a required rotating mode. The rotating mode is mainly based on simulating the swinging of a human arm, comprising such modes as rotating at a random rotational velocity, rotating with a random rotation angle, rotating in a random rotation direction (clockwise or anticlockwise), rotating in a random continuing rotation time, and a random suspended rotating time, and the like. During the running process, an eccentric rotor in the automatic winding watch **100** is utilized to automatically wind the watch under a gravity force.

As shown in FIG. **2**, the box body **10** is a hollow structure so as to hold the driving mechanism **40**. Moreover, the box body **10** is a sealed box body preferably, which can prevent the noise produced during the working of the driving mechanism **40** from being transferred out, and reduce the noise of the automatic winding device. Materials and shapes of the box body **10** are not defined. The materials can be lumber, plastic or metal and the like, and the shapes can be polygon, round and the like, which can be arranged according to the demands. The rotating seat **20** is arranged on the box body **10**. The bottom of the rotating seat stretches into the box body **10** and is connected with the driving mechanism in the box body **10** through arranging a joint pin **21**. Similarly, materials and shapes of the rotating seat **20** are not defined. The materials can be lumber, plastic or metal and the like, and the shapes can be polygon, round and the like, which can be arranged according to the demands. Moreover, the rotating seat **20** can be circular or tubular.

The box body **10** is further provided with a power indicator light **11**. The power indicator light **11** is electrically connected with the control device. The power indicator light **11** can have lighting modes of different colors, for example, when the automatic winding device is running, the light is green. When the power supply of the automatic winding device is insufficient, the light is red. Therefore, the control device can be provided with a dimming driving module accordingly so as to drive the lighting mode of the power indicator light **11**. In order to reduce the power consumption of the power indicator light **11**, the power indicator light can be controlled by the dimming driving module to light flickeringly. When the automatic winding device is running, the power indicator light **11** is primarily green, and then gradually turns to dark so as to save the power consumption of lighting. The power indicator light can flicker in every five seconds or above to display the running state of the device.

As shown in FIG. **2-6**, the holding seat **30** is fixed on the rotating seat **20** and driven by the rotating seat **20** to rotate. The holding seat **30** is bowl-shaped or drum-shaped. In the embodiment, the holding seat **30** can be fixed on the rotating seat **20** in a detachable way. The holding seat **30** can comprise a U-shaped framework **31** and a flexible mandrel **32** arranged in the framework **31**. The automatic winding watch **100** can be sheathed on the flexible mandrel **32**. Two relative side plates **311** of the framework **31** are respectively formed with an elastic locking arm **312** used for fixing the holding seat **30** on the rotating seat **20**. The distance between the two elastic locking arms **312** is or larger than the width or diameter of the corresponding position of the rotating seat **20**. When the automatic winding watch **100** is sheathed on the holding seat **30**, a watch dial of the watch **100** is arranged on a panel **313** between the two side plates **311** of the framework **31**, while a watch band is twisted on the flexible mandrel **32** between the two side plates **311**. The arrangement of the flexible mandrel **32** makes the holding seat **30** be applicable for sheathing the watch **100** having the watch band of different lengths.

Preferably, the tail end of the elastic locking arm **312** towards the rotating seat **20** is provided with a clamping bolt **314**. The rotating seat **20** is provided with a clamping groove **22** matched with the clamping bolt **314**. When the rotating seat **20** is circular, the clamping groove **22** is arranged on the internal side surface of the rotating seat **20**. When the rotating seat **20** is tabular, the clamping groove **22** is arranged on the surface of the rotating seat **20** facing to the holding seat **30**. The flexible mandrel **32** is made of elastic materials such as

foam material, sponge and the like. The outside of the flexible mandrel **32** can further be coated with a flexible material layer such as a woven fabric or leather and the like, to enhance the blazonry and grade of the holding seat **30**. The framework **31** is made of rigid materials, such as plastic, sheetmetal and the like, has certain elasticity and toughness, and can be bent so as to be not easily fractured.

When the holding seat **30** is fixed on the rotating seat **20**, the elastic locking arms **312** at the two sides of the framework **31** are pressed towards the inside of the framework **31**. When the two elastic locking arms **312** are pressed towards the inside, the flexible mandrel **32** is also pressed. The clamping bolt **314** of the elastic locking arm **312** is aligned with the clamping groove **22** of the rotating seat **20** and then clamped therein. The pressing of the elastic locking arm **314** is released, and the flexible mandrel **32** extends to a primary state, while after the elastic locking arm **312** restores to a primary position, the clamping bolt **314** thereof is stably clamped in the clamping groove **22** of the rotating seat **20**, thus finishing the fixation of the holding seat **30** on the rotating seat **20**. During disassembling, the elastic locking arm **312** is pressed towards the inside similarly so that the clamping bolt **314** breaks away from the clamping bolt **22**; in this way, the holding seat **30** can be taken down from the rotating seat **20**; therefore, operation is convenient. The extendable elasticity effect of the flexible mandrel **32** after being compressed can help the elastic locking arm **312** to recovery, and can make the elastic locking arm **312** to be more stably clamped with the rotating seat **20**, and not easily broken away.

Further, concave limiting grooves **310** can be respectively arranged on the side surfaces of the two elastic locking arms **312**, which are convenient for fingers to be aligned in the limiting grooves **310**, to press the elastic locking arms **312** and control the clamping bolts **314** to be clamped with or broken away from the clamping grooves **22**.

As further shown in FIG. **1**, the automatic winding device can further comprise a box cover **60**. The box cover **60** is covered on the box body **10** to shield the rotating seat **20** and the holding seat **30** between the box body **10** and the box cover **60**, thus being capable of protecting the rotating seat **20**, the holding seat **30** and the automatic winding watch **100** and the like, and can prevent dust. The box cover **60** can be a transparent box cover made of a transparent material. In this way, even if the box cover **60** is covered on the box body **10**, the situations of the rotating seat **20** and the automatic winding watch **100** and the like arranged therein can be still seen clearly. Certainly, the box cover **60** can also be a nontransparent box cover made of a nontransparent material, thus avoiding that the situations of the rotating seat **20** and the automatic winding watch **100** and the like between the box cover and the box body **10** are visible.

As shown in FIG. **7** and FIG. **8**, the driving mechanism **40** comprises a motor **41** and a transmission case **42** connected between the motor **41** and the rotating seat **20**. The motor **41** is electrically connected with the control device. The power indicator light **11** is electrically connected with the control device. A dimming driving module is arranged on the control unit. The transmission case **42** comprises an input gear **421** connected with the motor **41**, a first gear **422** engaged with the input gear **421**, an output gear **424**, and a plurality of second gears **423** engaged between the first gear **422** and the output gear **424** in sequence. The transmission case **42** is fixedly connected with the rotating seat **20** through the output gear **424**. The bottom of the rotating seat **20** is provided with a joint pin **21**. The joint pin **21** stretches into the box body **10** and is connected with the output gear **424**. Moreover, the inside of the box body **10** is provided with a bearing support **12** corresponding to the joint pin **21**. The bearing support **12** is used for installing a bearing, wherein two bearings are preferred; in this way, the rotating seat **20** stably rotates on the box body **10** without rocking.

In the transmission case **42**, the motor **41** having the characteristics of normal high speed/low torque can be converted into the motor **41** having the characteristics of low speed/high torque motor **41** through the arrangement of the first gear **422** and the plurality of second gears **423**, and the rotating seat **20** is driven to rotate through the output gear **424**. As shown in FIG. **8**, and in the embodiment, the transmission case **42** comprises four second gears **423**. The control device controls the motor **41** to rotate at a rotational velocity to drive the input gear **421** to rotate, drives the four second gears **423** to rotate in sequence through the first gear **422**, and finally drives the output gear **424** to rotate. The rotational velocity is gradually reduced after passing through the first gear **422** and the four second gears **423**, so that the final rotational velocity of the output gear **424** is preferably 4-9 revolutions/minute (RPM).

With reference to FIG. **7** and FIG. **8**, the transmission case **42** can also comprise a shell **420**. The input gear **421**, the first gear **422**, the plurality of second gears **423** and the output gear **424** are all installed in the shell **420**. The shell **420** can be connected in the box body **10** through a plurality of erection columns **13**.

As shown in FIG. **9**, and with reference to FIG. **7** and FIG. **8**, the control device comprises a control unit **51**, an optical sensor **52** used for inducing the rotational velocity and rotation angle of the driving mechanism, a random number generation module **53** for generating random parameters, a pulse duration modulation module **54** (pulse duration modulation (PWM)) matched with the random parameter generation module **53** so as to generate a corresponding random rotating mode, and an H bridge driving circuitry **55**. The optical sensor **52**, the random parameter generation module **53**, the pulse duration modulation module **54** and the H bridge driving circuitry **55** are all electrically connected with the control unit **51**. Moreover, the random parameter generation module **53**, the pulse duration modulation module **54** and the H bridge driving circuitry **55** can all be arranged on the control unit **51**. In the embodiment, the control device is arranged in the box body **10**. The random parameter generation module **53** generates random parameters and generates a corresponding random rotating mode with reference to the pulse duration modulation module **54**. The H bridge driving circuitry **55** controls the random rotation direction of the motor **41** according to a corresponding signal of the pulse duration modulation module **54**, so that the motor **41** rotates according to the random rotating mode. The rotating mode comprises such modes as rotating at a random rotational velocity, rotating with a random rotation angle, rotating in a random rotation direction, rotating in a random continuing rotation time, and a random suspended rotating time, and the like. The random rotational velocity is no lower than 4 revolutions/minute, and is preferably 4-9 revolutions/minute. The random rotation angle is not smaller than 90 degrees. The rotation direction is clockwise or anticlockwise; moreover, the total revolutions on the clockwise direction are not smaller than 700, and the total revolutions on the anticlockwise direction are similarly not smaller than 700. The continuing rotating time is not less than 15 seconds, and the suspended rotating time does not exceed 10 seconds. Various rotating modes of the driving mechanism are circularly operated in every 24 hours. The plurality of random rotating modes enable the winding manner of the automatic winding device on the automatic winding watch **100** to simulate the swinging manner of a human arm, and enables the winding manner diversified and personalized.

The power indicator light **11** is also connected with the pulse duration modulation module **54** through the control unit **51**, and control the voltage volume of the power supply applied to the power indicator light **11** through a pulse duration modulation technology, which can realize such modes that the luminous intensity of the power indicator light **11** is increased from small to big and decrease from big to small, and the like.

The transmission case **42** also comprises a detection gear **425** engaged with the first gear **422**. The optical sensor **52** mainly senses the rotational velocity and rotation direction of the detection gear **425**. The optical sensor **52** is matched with the detection gear **425**, so that the light beams of the optical sensor **52** irradiate towards the direction of the detection gear **425**. The optical sensor **52** is electrically connected with the H bridge driving circuitry **55** through the control unit **51**. The H bridge driving circuitry **55** controls the rotation direction of the motor **41** according to a signal of the pulse duration modulation module **54**. The motor **41** drives each gear in the transmission case **42** to rotate. Meanwhile, the detection gear **425** also rotates, and is sensed by the optical sensor **52** during the rotating process. Moreover, the signal sensed is fed back to the control unit **51**. The rotation situation of the output gear **424** is detected through the detection gear **425**, i.e. the rotational velocity and rotation angle of the output gear **424** can be obtained through the rotational velocity and rotation angle of the detection gear **425**. The detection gear **425** and the output gear **424** are linked and engaged through the first gear **422** and the plurality of second gears **423**. The detection gear **425** is arranged capable of detecting that the rotation angle of the output gear **424** is smaller than 1 degree.

The optical sensor **52** is preferably an infrared sensor, senses the rotational velocity and angle of the detection gear **425** through emitting infrared light beams onto the detection gear **425**, and generates a corresponding signal and feeds the signal back to the control unit **51**. The control unit **51** can determine the actual rotational velocity and angle of the input gear **424** through processing the received feedback signal. A plurality of uniformly-spaced through holes **400** are arranged on the detection gear **425**, encircling the central axis of the detection gear **425**. Infrared light beams of the optical sensor **52** are alternatively irradiated on the detection gear **425** through the through holes **400** during the rotating process of the detection gear **425**. When the infrared light beams are irradiated to the through holes **400**, the infrared light beams are not irradiated on to the detection gear **425** through the through holes **400**.

The automatic winding device can employ such modes as battery, electronic or directly external power supply and the like to supply power and run. In the embodiment, as shown in FIG. **10** and with reference to FIG. **7**, a battery room **14** used for accommodating a battery **70** is arranged on the side surface or bottom of the box body **10**. The battery room **14** is electrically connected with the control unit **51**. A dry battery or a rechargeable battery can be employed as the battery **70**, and the rechargeable battery is preferred. Accordingly, the box body **10** is further provided with a power socket **15** connected with the battery room **14**, for a power line to be spiced with an external power supply and charge the rechargeable battery. The box body **10** is also provided with an on-off key electrically connected with the control unit **51**, used for connecting or disconnecting the power supply.

The control unit **51** of the control device applies a voltage onto the motor **41** through the pulse duration modulation module **54** so as to control the rotational velocity of the motor **41**. As shown in FIG. **11**, the voltage is applied to the motor **41** through the pulse duration modulation module **54** with one time period **210**, wherein **208** is a time period for switching on the voltage, and the voltage is applied to the motor **41** by switching on and off the power supply **204** through a switch **202**. Because the rotational velocity of the motor **41** depends on the voltage level of the power supply **204** and the self load of the motor **41**, closed-loop velocity control of an electrode **41** is realized through detecting the voltage level of the power supply **204** and the signal feedback time for the optical sensor **52** to sense the position between the detection gear **425** and the through holes **400**.

As a preferred embodiment, and as shown in FIG. **12**, the control device controls the rotation direction of the motor **41** through the H bridge driving circuitry **55**. The switch **202** comprises a first switch **302**, a second switch **302**, a third switch **303** and a fourth switch **304**. When the first switch **301** and the third switch **303** are switched on, the voltage of the power supply **204** is applied to the motor **41** through the first switch **301** and the third switch **303**, to control the motor **41** to rotate in a specific direction (for example, clockwise or anticlockwise); while when the second switch **302** and the fourth switch **304** are switched on, the voltage of the power supply **204** is applied to the motor **41** through the second switch **302** and the fourth switch **304**, to control the motor **41** to rotate in an opposite direction (for example, anticlockwise or clockwise), thus realizing the control of the rotation direction of the motor **41**.

The foregoing descriptions are merely preferred embodiments of the patent application, and the protection scope of the patent application are not limited by the foregoing embodiments. All technical solution under the concept of the patent application shall all fall within the protection scope of the patent application. It should be pointed out that, a plurality of improvements and polishing figured out by those having ordinary skill in the technical field under the premise of not departing from the principle of the patent application shall also be deemed as the protection scope of the patent application.

The invention claimed is:

1. An automatic winding device used for automatic winding watch, comprising a box body, a rotating seat arranged on the box body and relatively rotatable to the box body, a holding seat fixed on the rotating seat and used for placing the automatic winding watch, a driving mechanism driving the rotating seat to rotate, and a control device controlling a rotating mode of the driving mechanism, wherein the driving mechanism is arranged in the box body;

the control device comprises a random number generation module for generating random parameters, a pulse duration modulation module matched with the random number generation module so as to generate the rotating mode, and a driving circuitry; wherein the rotating mode is a random rotating mode corresponding to one of the random parameters, and the driving circuitry controls the driving mechanism to rotate according to the random rotating mode;

wherein the holding seat comprises a U-shaped framework and a flexible mandrel arranged in the framework for sheathing the automatic winding watch; and two relative side plates of the framework are respectively formed with an elastic locking arm used for fixing the holding seat on the rotating seat;

wherein the tail end of the elastic locking arm towards the rotating seat is provided with a clamping bolt; and the rotating seat is provided with a clamping groove matched with the clamping bolt.

2. The automatic winding device used for automatic winding watch according to claim **1**, wherein the rotating seat is

circular, and the clamping groove is arranged on the internal side surface of the rotating seat; or, the rotating seat is tabular, and the clamping groove is arranged on the surface of the rotating seat facing to the holding seat.

3. The automatic winding device used for automatic winding watch according to claim **1**, wherein the control device also comprises a control unit, and an optical sensor used for inducing a rotational velocity and a rotation angle of the driving mechanism, wherein the optical sensor, the random number generation module, the pulse duration modulation module and the driving circuitry are all electrically connected with the control unit.

4. The automatic winding device used for automatic winding watch according to claim **3**, wherein the driving mechanism comprises a motor and a transmission case connected between the motor and the rotating seat, and the motor is electrically connected with the control unit through the driving circuitry.

5. The automatic winding device used for automatic winding watch according to claim **4**, wherein the transmission case comprises an input gear connected with the motor, a first gear engaged with the input gear, an output gear, and a plurality of second gears engaged between the first gear and the output gear in sequence; the transmission case is fixedly connected with the rotating seat through the output gear; the bottom of the rotating seat is provided with a joint pin stretching into the box body and connected with the output gear, and a bearing support corresponding to the joint pin is arranged in the box body.

6. The automatic winding device used for automatic winding watch according to claim **5**, wherein the transmission case also comprises a detection gear engaged with the first gear, and the optical sensor is matched with the detection gear.

7. The automatic winding device used for automatic winding watch according to claim **6**, wherein a plurality of uniformly-spaced through holes are arranged on the detection gear, encircling the central axis of the detection gear; infrared light beams of the optical sensor are alternatively irradiated on the detection gear or to the through holes during the rotating process of the detection gear.

8. The automatic winding device used for automatic winding watch according to claim **7**, wherein the rotational velocity of the motor is under closed-loop control through detecting a voltage level provided to the motor and a signal feedback time of the optical sensor to sense a position between the detection gear and the through holes.

9. The automatic winding device used for automatic winding watch according to claim **3**, wherein the box body is further provided with a power indicator light, and the power indicator light is electrically connected with the control device.

10. The automatic winding device used for automatic winding watch according to claim **9**, wherein the automatic winding device further comprises a box cover; the box cover is covered on the box body to shield the rotating seat and the holding seat between the box body and the box cover; and the box body is a sealed box body.

11. An automatic winding device used for automatic winding watch, comprising a box body, a rotating seat arranged on the box body and relatively rotatable to the box body, a holding seat fixed on the rotating seat and used for placing the automatic winding watch, a driving mechanism driving the rotating seat to rotate, and a control device controlling a rotating mode of the driving mechanism, wherein the driving mechanism is arranged in the box body;

wherein the holding seat comprises a U-shaped framework and a flexible mandrel arranged in the framework for sheathing the automatic winding watch; and two relative side plates of the framework are respectively formed with an elastic locking arm used for fixing the holding seat on the rotating seat;

wherein the tail end of the elastic locking arm towards the rotating seat is provided with a clamping bolt; and the rotating seat is provided with a clamping groove matched with the clamping bolt.

12. The automatic winding device used for automatic winding watch according to claim **11**, wherein the rotating seat is circular, and the clamping groove is arranged on the internal side surface of the rotating seat; or, the rotating seat is tabular, and the clamping groove is arranged on the surface of the rotating seat facing to the holding seat.

13. The automatic winding device used for automatic winding watch according to claim **11**, wherein the control device comprises a random number generation module for generating random parameters, a pulse duration modulation module matched with the random number generation module so as to generate the rotating mode, and a driving circuitry, wherein the rotating mode is a random rotating mode and the driving circuitry controls the driving mechanism to rotate according to the random rotating mode generated by the pulse duration modulation module.

14. The automatic winding device used for automatic winding watch according to claim **13**, wherein the control device also comprises a control unit, and an optical sensor used for inducing a rotational velocity and a rotation angle of the driving mechanism, wherein the optical sensor, the random number generation module, the pulse duration modulation module and the driving circuitry are all electrically connected with the control unit.

15. The automatic winding device used for automatic winding watch according to claim **11**, wherein the control device comprises a control unit, an optical sensor used for inducing the rotational velocity and rotation angle of the driving mechanism, a random number generation module for generating random parameters, a pulse duration modulation module matched with the random parameter generation module so as to generate a corresponding random rotating mode, and an H bridge driving circuitry, wherein the optical sensor, the random parameter generation module, the pulse duration modulation module and the driving circuitry are all electrically connected with the control unit.

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